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ACCOMPLISHMENTS OF THE MILITARY RAILWAYS

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ACCOMPLISHMENTS OF THE MILITARY RAILWAYS

Major W. W. Sullivan

In the presentation of a paper on the military railways in this country and in France I am conscious that no summary description of the activities of that organization can be written which will do justice to the devoted labors of those who contributed to the success of the transportation problems confronting our Army at the beginning of the war. An adequate account of the activities of the Military Railways organization can be written only by historians who have the time and opportunity to tell in detail of the problems presented and the results attained. Not only is this true with respect to the activities of those in the United States who were charged with the responsibilities of producing the personnel and materials, but it applies more particularly to the contributions of those on the other side towards solving one of America's big problems of the war.

The first units of the American Expeditionary Force reached France in June, 1917. Among the pioneers were Engineer organizations, including railway, to whom had been assigned the task of constructing docks, railroads, warehouses, storage depots and of otherwise blazing the way for the magnificent army that was to follow. Practically all of the personnel and materials for the military railways were supplied through the efforts of the Director General Military Railways, who was attached to the office of the Chief of Engineers.

Mexican Operations

The activities of the Director General Military Railways might best be stated as having their inception in 1916 at the time active operations in Mexico appeared probable. In June of that year the Chief of Engineers, who had recognized the fundamental fact that transportation should be handled by transportation men, called together representatives of five National Engineering Societies to decide upon a railroad man who could operate the railroads in Mexico in case of our intervention, procure materials and promptly rebuild the railroads which it was expected would be destroyed by the Mexicans in their retirement. The Conference nominated Mr.

Samuel M. Felton, the president of the Chicago Great Western R. R. Co., formerly president of the Mexican Central Railway Co., and upon the recommendation of the Chief of Engineers the Secretary of War approved the appointment.

Mr. Felton accepted the title of Consulting Engineer and advisor to the Chief of Engineers in regard to railway work, and at once caused a canvas to be made of men in the United States familiar with railroad operations in Mexico. In a short time a sufficient force to fill the more important positions was engaged and General Funston had agreed to transfer out of available regiments as many railroad men as were needed. Immediate delivery to the Government of 100 locomotives was arranged. A number of railroad construction outfits were engaged, wrecking trains, construction trains and derricks were secured. Fifty thousand tons of relaying rail and a large quantity of other track materials were located and optioned. Upwards of one and a half million cross ties were optioned. The Union Tank Line Company agreed to furnish a supply of tank cars to haul water for troops. The entire stock of materials of the Western Union Telegraph Company and the Bell Telephone Company were placed at the disposal of the Government and arrangements were made for the immediate shipment, if needed, of poles, wires, cross arms and other fixtures including instruments and all other requirements, for 1200 miles of telephone lines. Armored cars for patrol service, each to carry a three-inch field piece and a number of machine guns were designed and were to be fitted on underframes used for American fifty-ton standard gondola cars. Fortunately all these were not needed, and after the Mexican situation had cleared Mr. Felton was ordered home; but he continued to act as advisor to the Chief of Engineers on railway matters.

Laying the Foundations

In February, 1917, the Chief of Engineers addressed a communication to the presidents of six of the railroad lines in Chicago requesting co-operation with Mr. Felton in the organization of a railway regiment with headquarters in Chicago which would be a part of the reserve citizen forces of the United States. Immediate response was made to that request; and when war was declared this unit was not only practically completed but the experience thus gained was very helpful in organizing others.

Inspection of French Railroads

Within a short time after our entry into the war it became apparent that particular and accurate knowledge of the French carriers must be had. American officials had been given to understand that it would be almost impossible to adapt conditions to American needs. For three years England had been meeting and solving transportation problems that confronted her expeditionary force and what was known of the achievements of the British had excited a great deal of admiration among American transportation officials. This being the situation it was decided to immediately send someone to England and France. On April 30, 1917, the Chairman of the Advisory Committee of the Council of National Defense requested Mr. Felton to come to Washington and discuss with the Railway War Board the question of making the investigation. After a talk with the Chief of Engineers it was decided that the organization of the railway regiments, then contemplated, should be completed by Mr. Felton and at the latter's suggestion a commission under the leadership of Major Wm. Barclay Parsons was appointed; Mr. W. A. Garrett was selected as the operating man, Mr. F. de St. Phalle as the mechanical man, Major W. J. Wilgus as the railway maintenance and construction man, and Major A. E. Barber as military advisor. The commission sailed May 14, 1917, and arrived at Liverpool on May 23. Upon its arrival in France the commission made a study of the transportation systems of the French and British armies and of the transportation problems which would confront our armies from debarkation ports to the front. Reports of progress were cabled to the Chief of Engineers and subsequently a written report of their findings was rendered.

Organization of Nine New Railway Engineer Regiments

At the request of the English and French Governments the Chief of Engineers recommended the organization of nine new railway operating, construction and shop regiments to help the allies in their work as they were short of railway men. This recommendation was approved by the Secretary of War on May 5, 1917, and Mr. Felton was directed to organize the regiments. It was decided to have each regiment obtain its quota by voluntary enlistment and in different sections of the United States. The 11th was organized in New York City, the 12th at St. Louis, the 13th in Chicago, the 14th in Boston, the 15th in Pittsburg, the 16th in Detroit, the 17th in Atlanta, the 18th in Seattle and San Francisco and the 19th in Philadelphia. The 12th, 13th and 14th were operating units; the others except the 19th were construction and maintenance units. The 19th was a shop unit. Each regiment had an enlisted strength of about 1,065 men. By June 2, 1917, one of the regiments was completely organized and ready to go abroad. Six regiments sailed in July, 1917, and the remainder in the early part of August, 1917.

Appointment of Director General Military Railways

In addition to the organization of these nine railway regiments careful studies were made of the cabled reports from the Parsons Commission. After General Pershing's arrival in France and the resulting definite military plans made exact estimates possible, it became apparent from requisitions sent to the Chief of Engineers that in order to handle such requisitions efficiently, a military railway section would have to be created in the office of the Chief of Engineers. As a step in that direction the Secretary of War appointed Mr. Felton Director General Military Railways under the Chief of Engineers, to have charge of all railway matters, personnel and materials, with authority to purchase the railway equipment, materials and supplies requisitioned by General Pershing. Mr. Felton took station in Washington on July 17, 1917. The office of the Director General Military Railways was opened with a staff consisting of one officer and three clerks. Colonel M. C. Tyler was Senior Aide and Military Advisor. He was succeeded by Colonel J. M. Wright in September, 1918. In a short time Colonel F. A. Molitor, who in civil life had been a railway civil engineer of wide experience in construction and consultation work, was placed in charge of the maintenance of way division and floating equipment and a civilian, Mr. J. Milliken, later commissioned a colonel, formerly Superintendent of Motive Power on one of the Pennsylvania lines, was placed in charge of the division of design and procurement of motive power and equipment. Colonel Molitor was later sent to France and Colonel Milliken took charge of his division also. In January, 1918, an Inspection Division in charge of Major P. H. Ashmead and a Statistical and Accounts Division, to which I was assigned, were organized. Mr. R. A. Smith was placed in charge of the Traffic Division organized to trace for missing cars, and look after traffic of the office.

When the armistice was signed the office personnel of the Director General Military Railways consisted of 102 officers, 118 enlisted men and 57 civilians.

Organization of Additional Engineer Regiments

Shortly after the first nine railway regiments had sailed the formation of other railway and technical regiments was undertaken under the supervision of the Director General Military Railways, who in the meantime had organized a Personnel Division in the office. Through inquiry of railway companies railway men who had been drafted and placed in other regiments were located and transferred to railway regiments, advertisements were inserted in technical and other journals to attract former railway men who had engaged in other occupations and various means were adopted for the procurement of experienced railway men other than those employed by the transportation companies in the United States. When the armistice was signed the Director General Military Railways had organized a total of 1,970 officers and 81,211 men, of whom 1,758 officers and 67,423 men had been shipped overseas. Preparation had also been made for the organization of 768 additional officers and 49,000 men when hostilities ceased.

Methods Employed to Insure Complete Working Units

It may be appropriate to mention here the methods used in the formation of regiments. In the case of the 19th, the shop regiment, a list of occupations of men employed in three of the large shops on the Pennsylvania Railroad was prepared. The shops selected were those employing from 1,000 to 1,500 men each and were considered representative heavy repair points. An average of the number of men in every occupation was arrived at, the general occupations were then subdivided and an estimate was made of the number of experts required in all phases of locomotive construction. These data formed the basis of the make-up of the regiment by occupation, i. e., machinists, boiler-makers, blacksmiths, etc.

The 35th Engineers was organized as a car shop and car erecting unit and the make-up was established in the same manner as in the case of the 19th Engineers, after obtaining data from representatives of car manufacturers. The organization of operating and construction regiments was worked out with the same attention to detail. In this respect the requirements of the British operating units were of great assistance.

Use of Fort Benjamin Harrison

In the early period of the war the organization of regiments was accomplished by the induction of men engaged in railway service, but when the strain on the railroads began to be felt the practice was stopped, and in April, 1918, a military railway camp was established at Fort Benjamin Harrison under the supervision of the Director General Military Railways. This camp supplied practically all railway units thereafter sent abroad.

Stevedore Personnel

The supply and training of stevedore personnel was transferred in September, 1918, to the Engineers, and the Director General Military Railways assumed charge. Between that date and the signing of the armistice 2 battalions of 24 officers and 2,034 men, also 23 casual officers, were organized and shipped overseas.

Russian Railway Service Corps

In the latter part of 1917 the Director General Military Railways undertook the formation of an organization of railway men for use as railroad instructors on the Trans-Siberian Railroad. The arrangements provided that the corps was to be organized along military lines; but the members were not officers of the United States Army. They were, however, all to be commissioned officers with the same rank as our Army and wearing a uniform like that of the United States except the coat carried a lapel similar to the English uniform. The men were paid out of funds supplied by the Russian Ambassador. The corps with a strength of 288 officers sailed from San Francisco for Vladivostok on November 19, 1917, reaching there December 14. Due to unsettled conditions the transport left Vladivostok for Nagasaki, Japan, where the personnel remained idle for a considerable time, although attempts were made to operate as originally planned. Some were returned to the United States, and at December 31, 1918, there were 194 members of the corps in Russia.

Purchase and Production of Railway Articles

The purchase and production of railway articles occupied the major portion of the time of the Director General Military Railways and his staff. At the time of the declaration of war practically all articles for use of Engineer troops were purchased by the officer in charge of the General Engineer Depot under the Chief of Engineers. The organization of the office of the Director General Military Railways created two purchasing bureaus under the Chief of Engineers; and to simplify the matter it was agreed that the Director General Military Railways would negotiate all transactions with regard to the procurement, terms of payment and production of railway articles; and the formal order, or contract, would be prepared in the name of the officer in charge of the General Engineer Depot.

Coming from civil life where he had established his own system of making purchases of railway articles, Mr. Felton found it difficult to adapt himself to the purchasing requirements established by army regulations. He explained this to the Secretary of War who immediately saw the practical side of the question and issued an order instructing that all purchases by the Director General Military Railways be completed as directed by the latter in all particulars. This opened the way for the purchase of articles along familiar lines, and it was the means of greatly expediting deliveries.

Practically all requisitions for railway articles were by cable to the Director General Military Railways. The first requisition was was for 300 locomotives and 150,000 tons of rails and fastenings. Representatives of the Baldwin and American Locomotive Works were called into conference and an order was placed with each company for 150 locomotives. The Baldwin order was placed July 19, 1917, and the first locomotive was built, tested, knocked down, packed and ready for shipment on August 10, just 20 working days after the order was placed. This established a record in locomotive construction. Only 102,000 tons of rail were ordered initially because of price conditions.

Other requisitions began to appear for additional locomotives and for cars, rails, accessories, water stations, steam shovels, locomotive cranes, etc. Prompt action was taken to purchase and produce the essential articles required. In determining the essential articles the staff was instructed to treat the matter as in the case of a washout on a large scale and to hurry forward the articles most urgently needed in such a case.

In shipping locomotives it was decided, on the advice of the builders who had previously been shipping them on a comparatively small scale, to box each in such manner that a complete locomotive would require nineteen packages and occupy about four cars in transit to port.

The war was the cause of many innovations and the military railways contributed its share. One was the shipment overseas of set up locomotives. The suggestion was first made by the Director General Transportation who had learned that the English were shipping them across the channel. When the locomotive builders were consulted they pronounced it impossible; and after they were induced to try it the department in charge of shipping operations would not assign transports for the service. Finally, after a great deal of work and practically staking his reputation on the success of the undertaking the transport Feltore was assigned to the Director General Military Railways, who personally superintended its loading and sent a mechanical man across with it to watch the effect of the roll of the vessel. A peculiar coincidence is that this transport had been christened after a port in Cuba, which, in turn, had been named in honor of Mr. Felton's father. The port officers loaded 33 locomotives on this transport. It arrived safely on the other side, and the debarkation forces unloaded it in much less time than that required in the case of transports containing knocked down locomotives. The assembling forces were also able to place these locomotives in serviceable condition within a very short time. This test was so successful that arrangements were made to ship others, and altogether there were 533 set-up locomotives shipped. The standard locomotive consisted of the consolidated type. Its tractive power was 35,600 pounds, and it weighed 166,400 pounds when in working order.

Not the least important of the many cases coming before him was the decision reached by the Director General Military Railways on the receipt of the first requisition for cars. The order was for 17,000 four-wheel cars of the French type, 10-ton capacity. After careful consideration it was decided to adopt the American eight-wheel type of car of 33-ton capacity. This was approved and because of increased capacity the order was reduced to 6,000 cars. This type became the standard and it is estimated that the saving effected by its adoption was approximately $189,000,000 in money and at least 50% in shipping requirements.

The cars were shipped knocked down and were packed in lots of 50. Each lot contained 1,339 packages and required about 25 cars for their transportation to ports. All cars had air brakes and were equipped with French appliances, including couplers.

A plan was worked out requiring a certain number of turnouts per mile of track, and port officers loaded the standard requirements of turnouts, switches and all accessories with each shipment of rail.

As the army program increased and additional materials were required the personnel of the office was expanded. In July, 1918, the Director General Military Railways assumed charge of the General Engineer Depot and the purchase of supplies for all Engineer troops. About that time the need of locomotive cranes for use both on this side and the other side became very acute. The manufacturers could not produce them in sufficient quanties to fill the requirements, and a number of second hand cranes were purchased. In a few instances the owners asked what was considered exorbitant prices, and the cranes were commandeered.

Russian Railway Articles

At the time of the fall of the Kerensky Government in Russia there was a vast accumulation of war materials in this country awaiting shipment to Russia. The Secretary of War directed the Director General Military Railways to take charge of the railway articles, and the latter distributed over 200,000 gross tons of rail originally manufactured for use in Russia. A part was apportioned to Government plants in the United States which had been unable to purchase such articles due to congested condition of steel mills, and upwards of 41,000 gross tons were shipped to France. Locomotive manufacturers had built 200 locomotives for use in Russia which the Director General Military Railways purchased; and because they were not serviceable for use by our army in France they were fitted with American appliances and rented to railroads in this country.

Inspection and Shipment of Articles

All articles purchased were subject to inspection by representatives of the Director General Military Railways. Engineer officers were assigned to the most important work, and two reliable engineering firms were employed to assist. Standard packing and marking instructions were issued. Inspectors were required to supervise all shipments and to issue Government bills of lading therefor. Complete lists of the contents of each package were prepared by inspectors, and copies enclosed in the packages for use on the other side. Inspectors' certified reports and packing lists were mailed to port officers, to the Director General Military Railways and to those interested on the other side. Invoices were paid on information contained in these reports. Port officers made daily reports of articles received and shipped overseas and a ledger of the status of each order was maintained.

Important Railway Articles Purchased

Of the important articles there had been ordered 3,750 standard gauge locomotives, 1,501 narrow gauge locomotives, 46 36″ gauge locomotives, 90,519 standard gauge cars, 8,530 narrow gauge cars, 400 36″ logging cars, 749,345 gross tons of 80-lb. rails, being sufficient for about 6,000 miles of single track, 423 locomotive cranes ranging in capacity from 7½ to 120 tons, 76 gantry cranes, complete equipment for more than 100 water stations, 2 general repair shops for standard gauge railroads, 2 general repair shops for narrow gauge railroads, one car erection shop and 36 engine houses. The value of all orders placed amounted to $612,392,000. The production program just prior to the signing of the armistice provided for the delivery of 300 locomotives and 8,000 cars per month. When hostilities ceased the Director General Military Railways cancelled one order for 1,500 locomotives which would have cost $56,662,000, without any expense to the Government. Orders for 41,465 cars, costing $101,000,000, were also cancelled, with practically no expense to the Government.

Port Operations

Most of the Engineer materials were shipped from Harrison, N. J., and Norfolk, Va. Some tonnage was exported at Philadelphia and some at Baltimore. A small tonnage, cross ties especially, was exported from southern ports on the Gulf. At December 31, 1918, the shipment overseas included 1,395 standard gauge locomotives, 361 narrow gauge locomotives, 45 36″ locomotives, 19,162 standard gauge cars, 4,421 narrow gauge cars, 400 36″ cars and 298,923 tons of 80-lb. rails with all accessories. The tonnage of all Engineer articles shipped overseas was 1,555,000 tons, and of the important items only

10 locomotives, 100 dump cars and 200 flat cars were lost at sea.

Embarkation Service

In a little more than a year and a half the Army created an embarkation service which succeeded in shipping overseas 2,075,834 men and 5,153,000 tons of cargo. These figures do not adequately express the extraordinary nature of the achievement. As time was required for the drafting and training of men and for organizing the production of supplies, most of the stupendous movement occurred in the last half of our active participation in the war. From January 1, 1918, to the signing of the armistice, the Army embarked 1,880,339 men and shipped 4,660,000 tons of cargo. Nothing to compare with the movement of this tremendous number of men and tons of supplies across the Atlantic Ocean is known in the military history of the world.

Operations in France

In May, 1917, Colonel (now General) Harry Taylor was appointed Chief Engineer, A. E. F. He arrived in France early in June of that year, and on July 5, 1917, assumed charge of the Transportation Department. This was a temporary arrangement, while General Pershing and his Staff were making a study of the report on the transportation history of the allies. As a result of that study, General Pershing cabled to the Secretary of War that he was convinced the operation of railroads must be under a man with large experience in managing commercial railroads at home, and that the successful handling of railroad lines was so important that the ablest railroad man in the country should be sent to him after selection. Upon the recommendation of the Director General Military Railways, Mr. W. W. Atterbury, operating Vice President, Pennsylvania Railroad, was selected, and in August, 1917, went to France as Director General Transportation. Mr. Atterbury was appointed Brigadier General in October, 1917.

It was understood he was to report directly to the Commander-in-Chief and to assume all responsibility of transportation affairs, including authority over the construction, maintenance and operation of standard gauge lines of communication, the narrow gauge lines in the advance section, and all highways. Accordingly, he arranged an organization similar to the commercial railroad organizations in this country. Colonel W. J. Wilgus, who had gone over with the Parsons Commission, was detailed Deputy General of Transportation; General W. C. Langfitt as Manager of Light Railways, Colonel J. A. McCrea as General Manager Transportation Department, Colonel C. M. Bunting, Business Manager, and Colonel H. C. Booz, Engineer of Construction. During the progress of the war the authority of the Director General Transportation over operations in the lines of communication was changed; and when hostilities ceased his activities included the maintenance and operation of all standard gauge railways and canals under American control, operation of inland waterways and transports in European countries, compilation of accounts due United States for materials furnished French railroads, compilation of statistics showing classified tonnage received at ports, moved over railroads and delivered at rail-heads, procuring of railway supplies, control of telephone and telegraph for railway purposes, and of railway and stevedore personnel. The construction and operation of the light railways and roads was under the Chief Engineer; and the construction of standard gauge railroads, shops, buildings, docks, warehouses and lighters was under the division of construction and forestry.

Contrary to reports received previous to the investigations made by the Parsons Commission it was found that the physical condition of the French railroads was excellent for all practical purposes. The real needs of the French were found to consist of enlarged and improved port facilities for the prompt release of bottoms; the expansion of yards and multiple tracking in the zone of the interior where required for the more efficient movement of troops and army supplies; the reconstruction of railroads and canal structures injured or destroyed by the enemy; the building of rail lines for military purposes in the army zone and the maintenance of a portion or all of such work.

Activities of Transportation Department

While the French had sufficient rolling stock for their needs it was early apparent that the requirements for the prompt transportation of our Army included the supply of American rolling stock operated by personnel familiar therewith. With that object in view, arrangements were made for our forces to operate their own trains, from ports of debarkation to the front, over French railways in accordance with what we here term "trackage rights."

The next step was to have our men familiarize themselves with the use of French motive power and equipment. Operating regiments were broken into detachments, interpreters placed at every station, roundhouse, shop, etc., and American crews were assigned to work with the French in corresponding capacities and under French supervision. The French methods were quickly acquired, and in October the operation of the lines controlling a portion of the zone the Americans were to occupy was transferred to the Railway Engineers. While awaiting the assignment of American equipment that of the French was used. This equipment was different from the American type in many respects. Some of the engines were equipped with open cabs, affording no protection from the elements; the cars were small, with a capacity ranging from 9 to 20 tons, equipped with link couplers with a screw-jack, which necessitated trainmen going between the cars to couple them and afterwards screw up the jack to make the slack uniform. The danger to the men was increased by bumper castings on the end of each car. The cars were old and frail, easily derailed by sudden stops, and subject to telescoping by the least rough handling. None of the cars were equipped with air brakes, braking power being maintained by hand-brakes governed from a small cab at the top and end of the cars.

The Continental system of time, i. e., 1 o'clock to 24 o'clock, was used, the official day beginning at midnight. The movement of trains was by Station Block system, and in the case of the use of double track lines the current of traffic was on the left-hand track. The standard gauge of French railroads is 4'8-11/16".

I quote from a copy of the Rules governing train operation issued by the Director General Transportation, effective June 1, 1918:

General Notice

The regulations herein set forth are issued for the guidance of Officers, Non-commissioned Officers, Enlisted Personnel and others of the Transportation Department engaged in railway operation. Where the operation is conducted jointly with the French Railways, their rules, as published in book form, under date of April 15th, 1918, entitled "Extract from General Regulations, Railways of France," will be complied with, and the rules contained herein which conflict with the French rules are not to be complied with.

On lines of railways operated wholly by the Transportation Department, the rules contained herein will apply in their entirety, supplemented by necessary instructions from Transportation Department Officers.

It is impractical to provide for every contingency which may occur in the working of railway lines in the area of the Advance Zone. Circumstances will arise in which the personnel should decide for themselves what is to be done and act on their own judgment.

It will be understood that their first duty is to satisfy the requirements of the Army. Ordinarily they will receive orders from Transportation Department Officers only, but in case of military necessity, they may receive orders from any Commanding Officers. Such orders, which should be given in writing, if practicable, will be promptly complied with, and report of having received such orders made to the nearest officer of the Transportation Department without delay.

The personnel will understand that they are required to take every precaution to prevent accident that their knowledge of railway work and of existing conditions dictates.

General Rules

A. Transportation Department Officers, Non-commissioned Officers and all others concerned in railway operation will provide themselves with a copy of these rules, be conversant therewith and obey them.

B. They will also be governed by such special instructions as may be issued by proper authority.

C. They will pass the required examinations for the branch of service to which they are assigned.

D. They will render every assistance in their power in carrying out rules and special instructions relating to the railway service, and will report to their Superior Officer any violation thereof.

E. Accidents, detention of trains, failure in the supply of water, or fuel, defects in the tracks, bridges or signals will be promptly reported to the nearest Transportation Officer in charge.

F. The use of any intoxicants while on duty is prohibited.

The first complete American train in France operated entirely by an American crew with American equipment was run on July 1, 1918, from Gievres to Nevers, a distance of 83 miles.

Repair and Erection Shops

Before France entered the war a large locomotive shop was under construction at Nevers. The Parsons Commission found this shop more than half completed and, because of its convenient location to the proposed American Lines of Communication, recommended that the property be taken over and completed by our forces. This was done, and the entire equipment therefor was supplied from the United States. The erecting shops for locomotives were at St. Nazaire and for cars at La Rochelle.

In less than a year after the Transportation Department commenced to function, it was operating its own trains over a system of railways larger than many of the more important railway systems in the United States; discharging supplies at a rate exceeding that maintained by the British during the period of their operatings in France; owning and operating hundreds of locomotives and thousands of cars, and adding to its equipment daily; repairing the war worn cars and locomotives of the French and Belgians; erecting its own rolling stock; and it had a personnel of nearly twelve hundred officers and thirty thousand men. It was also operating a canal system requiring the services of thirteen officers and 286 civilians and at the cessation of hostilities it had reserve facilities in sight and necessary equipment on the way to meet any demands placed upon it.

Light Railways and Roads

During the war, in order to relieve the highways of their enormous burden of traffic it became necessary to evolve a supplementary means of transportation. This consisted of a net work of narrow gauge railways along the entire Western front, called Light Railways. The gauge adopted by the French, British, Americans, and even the Germans, was 60 centimeters (23-5/8″). As a rule it required from 7 to 10 miles of narrow gauge railways for each mile of front. The motive power was of steam and gasoline locomotives. The latter was used in the advanced areas so as not to attract attention of the enemy by smoke, sparks, etc., as would be the case in steam locomotives.

These lines radiated from railheads, i. e., points at which transportation by means of standard gauge trains ceased. Their primary function was to deliver ammunition, rations and supplies from railheads to points near the front. They were frequently used to take troops to the front and bring back the wounded.

The construction, maintenance and operation of the Light Railways and Roads was latterly under the Chief Engineer, A. E. F. The materials and men to operate were furnished by the Director General Military Railways. As the location of the railroads was constantly changed to meet tactical requirements it became necessary to adopt a type of track that could be quickly changed, laid or moved. Accordingly, arrangements were perfected for the manufacture of a track of 25-lb rail with steel ties attached thereto. These tracks were in five meter lengths (about 16′ 4″) and could be laid very rapidly. In one day an American crew of 12 men laid 4,572 feet of track.

The operation of these lines differed radically from those of standard gauge lines, as the longest run of a train in one direction rarely exceeded ten miles. Service was subject to frequent interruptions by shell fire, and many lines under direct observation could only be operated at night.

Construction Activities

Actual construction work was commenced in July, 1917, upon the arrival of the construction regiments who brought with them necessary tools and equipment.

At first the main ports of the arrival of American supplies were at St. Nazaire, Bordeaux and La Pallice. Later these were supplemented by Marseilles, Brest and other small ports. The main ports of debarking troops were St. Nazaire, Bordeaux and Brest. So far as practicable, French piers were used at these ports. These were supplemented by the construction of additional piers where needed. Under this program a 10-berth dock was constructed at Bassens, near Bordeaux, together with switching facilities and storehouses in the immediate vicinity. A 2-berth dock at Brest was constructed; an 8-berth dock at Montoir was commenced, and preliminary work for a 10-berth dock and storage depot at Talmont was under way when interrupted by the armistice.

At November 1, 1918, 67 ship berths had been obtained from the French, 12 ship berths constructed, and work had been projected on the construction of 28 more. The number of berths kept in advance of the necessities of the unloading. For September and October, 1918, the total number of berths actually used was 63, with 77 available.

A lighterage dock of 8 berths was constructed at St. Loubes, near Bordeaux, and 2 berths at St. Pardons. Fifty-eight 300-ton lighters were constructed of French timber, and twenty-six 500-ton lighters of American timber, besides seven derrick barges of from 30 to 100 tons lifting capacity.

The main Lines of Communication of the A. E. F. extended from St. Nazaire and Bordeaux. Other lines were used from Brest, Havre, Marseilles and other ports. The work necessary to prepare the main railroad systems for the use of the A. E. F. included the construction of a large storage yard near each of the ports, with tracks leading from the piers to them, appropriate receiving yards, humps, classification yards, running tracks, warehouse tracks, departure yards, and large depots at the ports and at the Intermediate and Advance Sections, with regulation stations for the service forward. The rapid increase in the program of troop arrivals, and the necessity of meeting the actual situation called for decision and wise discrimination as to what was necessary and what was not. Comprehensive plans prepared by the Transportation Department provided for track facilities. These plans contemplated four tracks for each line of storehouses and open space, two each side of the storehouse. At the intermediate depots all the traffic was handled on one track on one side of each line of storehouses and this plan was later adopted at the large base depots.

In order to relieve the congestion existing at Nevers a cut off was constructed south of that town. Work was commenced in June, 1918, and completed in October, and constituted about six miles of double track railroad, including a double-track bridge 2,190 feet long. This was the only piece of additional main line railroad constructed, although about 24 miles of third and fourth tracks were built.

In addition to standard gauge railways along the Lines of Communications it was necessary to construct standard gauge facilities including storage yards for hospital projects, ordnance storage yards, and aviation centers and construction plants, approximately 90 miles in all. A total of 937 miles of railroad were constructed. If this were laid in a continuous straight line track it would reach from the Atlantic Ocean at St. Nazaire, across France and Germany to the Russian frontier. Similarly, if all the building construction were consolidated into one building with a width of 20 feet, it would reach from St. Nazaire, across France, to a point about 100 miles beyond the Rhine.

Conclusion

The aim and struggle had been to put men and materials in France, where they were needed. How that was done and how well they were used by those in charge of our operations "over there" to build docks, miles of railroad, machine shops, storage depots and to successfully transport the Army of two million men, can be told only in the long reaches of historical inquiry when there will be time and opportunity to do so.